



CONCEPTUAL PHYSICS I SYLLABUS
9th-12th Grade Class
2022-2023

Catalog Description:

Physics gives every student the opportunity to better understand the world around them through exploration and application. Each student will gain a new appreciation of the magnificent world God has so intricately designed. By using a student's experiences in the world, instead of focusing on mathematical equations, they become more alive to the world around them. Conceptual physics makes a major contribution in teaching students how to think.

Short Description:

This course analyzes the basic principles of the physical world, provides the foundations for further science study, and develops basic critical and creative thinking.

Goals:

1. Students will be able to recognize the physics behind everyday things.
2. To gain a heightened appreciation for the intricacy of the world created.
3. Students will gain an ability to think more critically and systematically.
4. Students will gain the necessary skills to pursue further endeavors in science.
5. Students will develop the ability to work clearly and concisely in problem solving.

Course Outline:

1. First Quarter
 - a. The Nature of Science
 - b. Mechanical Equilibrium
 - c. Newton's First Law of Motion
 - d. Linear Motion
 - e. Projectile Motion
2. Second Quarter
 - a. Newton's Second Law of Motion
 - b. Newton's Third Law of Motion
 - c. Momentum
 - d. Energy
3. Third Quarter
 - a. Circular Motion
 - b. Rotational Equilibrium
 - c. Rotational Motion
 - d. Universal Gravitation
 - e. Satellite Motion
4. Fourth Quarter
 - a. Satellite Motion
 - b. The Atomic Nature of Matter
 - c. Solids
 - d. Liquids
 - e. Gases
 - f. Special Relativity-Space and Time, Relativity-Momentum, Mass, Energy and Gravity

Assignments:

1. First Quarter 8/17/22-10/13/22
 - a. 8/17-8/19
 - 1.) Read Chapter 1 About Science
 - 2.) Watch video: Introduction to Conceptual Physics

- 3.) Do Check Concept and Think and Explain Questions
- 4.) Discussion on questions
- b. 8/22-8/26
 - 1.) Read Chapter 2 Mechanical Equilibrium
 - 2.) Discuss concepts in chapter
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on question
- c. 8/29-9/2
 - 1.) Continue Chapter 2
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) Test Chapter 2**
- d. 9/6-9/9
 - 1.) Read Chapter 3 Newton's First Law of Motion---Inertia
 - 2.) Watch video: Newton's First Law
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- e. 9/12-9/16
 - 1.) Continue Chapter 3
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) Test Chapter 3**
- f. 9/19-9/23
 - 1.) Read Chapter 4 Linear Motion
 - 2.) Watch video: Linear Motion
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- g. 9/26-9/30
 - 1.) Continue Chapter 4
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) Test Chapter 4**
- h. 10/3-10/7
 - 1.) Read Chapter 5 Projectile Motion
 - 2.) Watch video: Vectors and Projectiles
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- i. 10/10-10-13
 - 1.) Continue Chapter 5
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) Test Chapter 5**
- 2. Second Quarter 10/18/22-12/16/22
 - a. 10/18-10/21
 - 1.) Read Chapter 6 Newton's Second Law of Motion---Force and Acceleration
 - 2.) Watch video: Newton's Second Law
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
 - b. 10/24-10/28
 - 1.) Continue Chapter 6
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions

- 4.) **Test Chapter 6**
- c. 10/31-11/4
 - 1.) Read Chapter 7 Newton's Third Law of Motion---Action and Reaction
 - 2.) Watch video: Newton's Third Law
 - 3.) Do Check Concept, Think and Rank, and Think and Explain Questions
 - 4.) Discussion on questions
- d. 11/7-11/10
 - 1.) Continue Chapter 7
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 7**
- e. 11/14-11/18
 - 1.) Read Chapter 8 Momentum
 - 2.) Watch video: Momentum
 - 3.) Do Check Concept Think and Explain Questions
 - 4.) Discussion on questions
- f. 11/21-11/25 Thanksgiving Vacation
- g. 11/28-12/2
 - 1.) Continue Chapter 8
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 8**
- h. 12/5-12/9
 - 1.) Read Chapter 9 Energy
 - 2.) Watch video: Energy
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- i. 12/12-12/16
 - 1.) Continue Chapter 9
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 9**
- 3. Third Quarter 1/9/23-3/10/23
 - a. 1/9-1/13
 - 1.) Read Chapter 10 Circular Motion
 - 2.) Watch video: Rotation
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
 - b. 1/17-1/20
 - 1.) Continue Chapter 10
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 10**
 - c. 1/23-1/27
 - 1.) Read Chapter 11 Rotational Equilibrium
 - 2.) Watch video: Center of Gravity
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
 - d. 1/30-2/3
 - 1.) Continue Chapter 11
 - 2.) Do Check Concept, and Think and Explain Questions
 - 3.) Discussion on questions

- 4.) **Test Chapter 11**
- e. 2/6-2/10
 - 1.) Read Chapter 12 Rotational Motion
 - 2.) Watch video: Rotational Mechanics
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- f. 2/13-2/17
 - 1.) Continue Chapter 12
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 12**
- g. 2/21-2/24
 - 1.) Read Chapter 13 Universal Gravitation
 - 2.) Watch video: Gravity 1, Gravity 2
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- h. 2/27-3/3
 - 1.) Continue Chapter 13
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 13**
- i. 3/6-3/10
 - 1.) Read Chapter 14 Satellite Motion
 - 2.) Watch video: Satellite Motion
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- j. 3/13-3/17 Spring Break
- 4. Fourth Quarter 3/20/23-5/25/23
 - a. 3/20-3/24
 - 1.) Continue Chapter 14
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 14**
 - b. 3/27-3/31
 - 1.) Read Chapter 17 The Atomic Nature of Matter
 - 2.) Watch video: Atoms
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
 - c. 4/3-4/6
 - 1.) Continue Chapter 17
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 17**
 - d. 4/10-4/14
 - 1.) Read Chapter 18 Solids
 - 2.) Watch video: Scaling
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
 - e. 4/17-4/21
 - 1.) Continue Chapter 18
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions

- 4.) **Test Chapter 18**
- f. 4/24-4/28
 - 1.) Read Chapter 19 Liquids
 - 2.) Watch video: Liquids I, II
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- g. 5/1-5/5
 - 1.) Continue Chapter 19
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 19**
- h. 5/8-5/12
 - 1.) Read Chapter 20 Gases
 - 2.) Watch video: Gases
 - 3.) Do Check Concept and Think and Explain Questions
 - 4.) Discussion on questions
- i. 5/15-5/19
 - 1.) Continue Chapter 20
 - 2.) Do Check Concept and Think and Explain Questions
 - 3.) Discussion on questions
 - 4.) **Test Chapter 20**
- j. 5/22-5/23
 - 1.) Watch movie "Interstellar"
 - 2.) Discuss relativity as it relates to the movie
 - 3.) Reference Chapters 15,16

Methods of Instruction:

- 1. Extensive use of Socratic discussion
- 2. Lecture
- 3. Video

Methods of Evaluation:

Since classroom participation is a primary element of this class, it constitutes one third of your total grade. The grade is determined by the teacher based on daily student observation. The elements included in these observations include: classroom discipline, daily preparedness, classroom discussion, involvement in discussion, thinking skills demonstrated in discussions, and daily reading assignment. The reading assignments are critical to this class. They constitute the "lecture" part of the class. Discussion is driven and enriched by out-of-class reading and thought. This is an honor class. All aspects of the class will operate at a higher level with higher student expectations.

1st Quarter

Tests Ch 2-5	100 points each	400 total
Homework Ch 2-5	20 points each	80 total
Participation 1.1-1.5	20 points each Ch.	100 total
Quarter Total		580 points

2nd Quarter

Tests Ch 6-9	100 points each	400 total
Homework Ch 6-9	20 points each	80 total
Participation 2.1-2.4	20 points each Ch.	80 total
Quarter Total		560 points

1st Semester

1st Qtr + 2nd Qtr = 1st Semester Final Grade

3rd Quarter

Tests Ch 10-13	100 points each	400 total
Homework Ch 10-13	20 points each	80 total
Participation 3.1-3.4	20 points each Ch.	80 total
Quarter Total		560 points

4th Quarter

Tests Ch 14, 17-20	100 points each	500 total
Homework Ch14,17-20	20 points each	100 total
Participation 4.1-4.5	20 points each	100 total
Quarter Total		700 points

2nd Semester

3rd Qtr + 4th Qtr= 2nd Semester Final Grade

Examples of Assignments:

Testing is primarily objective. The questions are conceptual in nature and require careful thought to answer them. There are a few essay style problems to be solved on tests. Homework involves answering a number of conceptual-oriented questions. Students are responsible to explain and defend their answers in class discussions.

Textbooks:

Required:

Paul G. Hewitt
Conceptual Physics
 Pearson Education
 ISBN: 0-13-364749-8
 2009

Behavior Policy:

1. We expect all students to express AVC's core values of Godliness, Obedience, Leadership, and Scholarship in and out of class.
2. We expect each student to respect the person and property of fellow students.
3. Since class discussion and debate is common, the following principles should be followed:
 - a. Genuine disagreement is an achievement because it enables people to learn. We assume that a disagreement is valuable until proven otherwise.
 - b. Deepening our understanding of truth or wisdom is more important in this class than winning an argument.
 - c. Respect is important in this class. The merits of a position may be debated, but persons may not be attacked.
 - d. If a student feels attacked, they should say so respectfully, and the teacher and class will assess the situation together.
4. In accordance with I Peter 3:15, students must express themselves with gentleness and respect to those in authority and to their peers.